ABSTRACT OF THE DISCLOSURE

A slip spline construction for a pair of shafts that are telescopically connected. The spline construction provides a driving connection between the shafts while permitting relative longitudinal displacement. One of the shafts has a radially extending portion spaced from the splines and engaging the other shaft. The radially extending portion forms a pilot that maintains the shafts in concentric relationship.

BACKGROUND OF THE INVENTION

In certain machinery, such as automotive drive trains, it is necessary to provide means to permit one shaft to be longitudinally displaced with respect to another shaft while maintaining a driving connection between the two shafts. For this purpose, internal and external mating splines are formed on the respective shafts. In prior art devices, the spline engagement is also relied upon to maintain concentricity between the shafts.

Due to manufacturing tolerances, clearances exist between the mating splines so that the shafts are not always maintained in proper concentric relationship. This clearance allows one of the shafts to cock into a skew position. The one shaft is permitted to orbit about an eccentric axis instead of rotating about its balance axis, and thereby, creating an unbalanced force and subsequent vibration. In the cocked position, the contact area between the spline teeth is very small causing extreme loading and precluding proper lubrication of the spline teeth. Poor lubrication, in turn, greatly increases the effort required for axial displacement between the shafts.

In view of the state of the art, it is the principal object of the present invention to provide a connection between two shafts that maintains the shafts in concentric relationship and reduces the loading on the spline teeth.

BRIEF SUMMARY OF THE DISCLOSURE

In accordance with the presently preferred embodiment of this invention, a first shaft has an externally splined portion and a second shaft has an internal bore with a portion of the bore having splines. The two shafts are telescopically related with their respective spline teeth in engagement and providing a driving connection. The internal shaft has an outwardly extending radial portion that engages the internal wall of the bore of the other shaft. The engagement between the radially extending portion and the second shaft maintains the two shafts concentric about their common axis. With this construction, the splines function merely as a means for providing a driving connection and are not relied upon for maintaining concentricity.

BRIEF DESCRIPTION OF THE DRAWINGS

The many objects and advantages of the present invention will become apparent from the following description.
slidably engaging said second bore portion, an O-ring seal disposed between said lands and sealingly engaging said second bore portion, said lands being constructed to maintain said shafts in concentric relationship.

References Cited

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FRED C. MATTERN, Jr., Primary Examiner
WESLEY S. RATLIFF, Jr., Assistant Examiner

U.S. Cl. X.R.